STANDARDIZATION ORGANIZATION FOR G.C.C (GSO)

Final Draft

GSO/FDS 1754/2011

Edible vegetable oils- Part 1

Prepared by:

Gulf technical committee for sector standards of

Food and agriculture products

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FORORED

The Gulf Standardization Organization for GCC (GSO) is a regional Organization which consists of the national organization for Standards and Metrology in GCC.

And its duties are emphasized on the preparation of standards specifications through specialized technical committees.

The GSO through its technical committee program TC NO .5 (Technical Committee of food and agricultural products) has revision GSO 1754/2006 “Edible vegetable oils-Part 1”

The Draft Standard has been prepared by (State of Qatar) in Arabic and English langues.

The standard has been approved as Gulf technical regulation by GSO Board of Direction in its meeting No…. /….. Held on …/…/…/H, /…/G

Edible vegetable oils- Part 1

This Gulf Standard has cancelled and replaced the following Gulf Standards:

1- GSO 115 " Edible soybean oil"
2- GSO 114 "Edible maize oil".
3- GSO 229 "Edible palm oil".
4- GSO 484 "Edible palm oil".
5- GSO 974 "Edible muster seeds oil".
6- GSO 1070 "Edible sunflower oil".
7- GSO 1074 "Edible Rapeseed oil- low erucic acid".
8- GSO 1365 "Edible safflower seed".

Edible vegetable oils- Part 1

1-Scope and field of application:

This Gulf Standard is concerned with edible vegetable oils mentioned in item (3).

2-Complementary references:

2.1 GSO 9 “Labeling of prepackaged foodstuffs”.

2.2 GSO 15 “Methods of sampling edible oils and fats”.

2.3 GSO 16 “Physical and chemical methods for testing edible oils and fats”.

2.4 GSO 17 “Methods of test for permitted food additives in edible oils and fats- Part 1”.

2.5 GSO 19 “Permitted food additives in edible oils and fats”.

2.6 GSO 20 “Methods for the determination of contaminating metallic elements in foodstuffs”.

2.7 GSO 21 “Hygienic regulations for food plants and their personnel”.

2.8 GSO ISO 5508 “Animal and vegetable oils and fats- Part 2: Analysis by gas chromatography of methyl esters of fatty acids”.

2.9 GSO 382, 383 “Maximum limits for pesticides residues in agricultural food products- Parts 1,2”.

2.10 GSO 839 “Food packages- Part 1: General requirements”.

2.11 GSO 988 “Limits of radioactivity levels permitted in foodstuffs –Part 1”.

2.12 GSO ISO 5509 “Animal and vegetable oils and fats- Preparation of methyl esters of fatty acids ”.

3-Definitions:

3.1 Edible vegetable oil: foodstuffs which are composed primarily of glycerides of fatty acids being obtained only from vegetable sources. They may contain small amounts of other lipids such as phosphatides,of unsaponifiable constituents and of free fatty acids naturally present in the fat or oil.

3.2 **Cottonseed oil** is derived from the seeds of various cultivated species of *Gossypium spp*

3.3 **Sunflower seed oil** (sunflower oil) is derived from sunflower seeds (seeds of *Helianthus annuus* L.).

3.4 **Mustard seed oil** is derived from the seeds of white mustard (*Sinapis alba* L. or *Brassica hirta*

Moench), brown and yellow mustard (*Brassica juncea* (L.) Czernajew and Cossen) and of black mustard (*Brassica nigra* (L.) Koch).

3.5 **Palm oil** is derived from the fleshy mesocarp of the fruit of the oil palm (*Elaeis guineensis*).

3.6 **Palm kernel oil** is derived from the kernel of the fruit of the oil palm (*Elaeis guineensis*).

3.7 Palm olein: **is** the liquid fraction derived from the fractionation of palm oil

3.8 **Palm stearin** is the high-melting fraction derived from the fractionation of palm oil.

3.9 **Palm superolein** is a liquid fraction derived from palm oil (described above produced through a specially controlled crystallization process to achieve an iodine value of 60 or higher.

3.10 **Rapeseed oil** (turnip rape oil; colza oil; ravison oil; sarson oil: toria oil) is produced from seeds of *Brassica napus* L., *Brassica rapa* L., *Brassica juncea* L. and *Brassica tournefortii* Gouan species.

3.11 **Safflower seed oil** (safflower oil; carthamus oil; kurdee oil) is derived from safflower seeds (seeds of *Carthamus tinctorious* L.).

3.12 **Safflower seed oil - high oleic acid** (high oleic acid safflower oil; high oleic acid carthamus oil high oleic acid kurdee oil) is produced from high oleic acid oil-bearing seeds of varieties derived from *Carthamus tinctorious* L.

3.13 **Soya bean oil** (soybean oil) is derived from soya beans (seeds of *Glycine max* (L.) Merr.).

3.14 ***Virgin oils*** are obtained, without altering the nature of the oil, by mechanical procedures, e.g. Expelling or pressing, and the application of heat only . They may have been purified by washing with water, settling, filtering and centrifuging only.

3.15 ***Cold pressed oils*** are obtained, without altering the oil, by mechanical procedures only, e.g. Expelling or pressing, without the application of heat. They may have been purified by washing with water, settling, filtering and centrifuging only.

4. Characteristics:

The following characteristics shall be met in edible vegetable oils:

4.1It shall be free from pig products and its derivatives or other animal fats.

4.2 It shall be free from other vegetable and mineral oils.

4.3 Its color, taste and odors shall be characteristics of the oil, and shall be free from rancidity and any foreign odor and taste.

4.4 The production shall be carried out according to Gulf Standard mentioned in item 2.7.

4.5 It shall be produced from sound, clean, free from rancidity,impureties and contaminants seeds ,grains or germs.

4.6 It shall be free from sediments and turbidity.

4.7 The erucic acid content in low- erucic acid rapeseed oil shall not exceed 2% (as % of total Fatty acds).

4.8 Slip point shall not exceed 24^{o}C and 19.5^{o}C for palm olein and palm superolein and shall not less than 44^{o}C for palm stearin.

4.9 Oleic acid content in high oleic acid sunflower oil shall not less than 75% oleic acid (as % of Total fatty acids).

4.10 The physical and chemical characteristics for edible vegetable oils shall be according Table No. (1).

4.11 Food additives:

4.11.1 No food additives are permitted in virgin and cold press oils.

4.11.2 The following additives are permitted to add to edible vegetable oils:

Item	Additive	Maximum level	INS No.
4.11.2.1	Flavors	Natural or synthetic flavors are permitted to add according to Gulf Standard mentioned in item 2.5.	
4.11.2.2	Antioxidants:		
	a-Ascorbyl palmitate	500 ppm Singly or in	304
	b- Ascorbyl stearate	combination	305
	c- Tocopherol concentrate,mixed		307b
	d- Tocophermol, d- alpha-	300 ppm singly or in	307a
	e- Tocopherol, dl-alpha-	compination	307c
	f- Propyl gallate	100 ppm	310
	g- Tertiary butylated hydroxylquinone (TBHQ)	120 ppm	319
	h- Butylated hydroxyanisole (BHA)	175 ppm	320
	i- Butylated hydroxytoluene (BHT)	75 ppm	321
	Any combination of f,g,h,I	200 ppm within individual limits	
	j-Dilauryl thiodipropionate	200 ppm	389
4.11.2.3	Antioxidant synergists:		
	-Citric acid	GMP	330
	-Sodium dihydrogen citrate	GMP	331(i)
	-Trisodium citrate	GMP	441(ii)
	-Isopropyl citrates		384

	-Citric and fatty acid esters of glycerol	100 ppm singly or in combination	472c
4.11.2.4	Antifoaming agents: Polydimethylsiloxane	10 ppm	900a

4.12 Fatty acids composition (% of total fatty acids) shall be as in Table No. (2).

4.13 Quality characteristics for vegetable oils shall be as follows:

Item	Characteristics	Maximum level
4.13.1	Matter volatile at 105^{o}C	0.2 % m/m
4.13.2	Insoluble impurities	0.05% m/m
4.13.3	Soap content	0.005% m/m
4.13.4	Iron content:	
4.13.4.1	Refined oils	1.5 ppm
4.13.4.2	Virgin oils	5.0 ppm
4.13.5	Copper content:	
	Refined oils	0.1 ppm
	Virgin oils	0.4 ppm
4.13.6	Acid value:	
4.13.6.1	Refined oils	0.6 mg KOH/g refined oil
4.13.6.2	Cold pressed and virgin oil	4.0 mg KOH/g oil
4.13.6.3	Virgin palm oils	10.0 mg KOH/g oil
4.13.7	Peroxide value:	
4.13.7.1	Refined oils	Up to 10 mill equivalents of active oxygen/kg oil
4.13.7.2	Cold pressed and virgin oil	Up to 15 mill equivalents of active oxygen/kg oil

4.14 Composition characteristics:

4.14.1 The Reichert value for palm kernel oil shall be in range 4-7.

4.14.2 The Polenske value for palm kernel oil shall be in range 8-12.

4.14.3 The Halphen test for cotton seed oil shall be positive.

4.14.4 The Crismer value for low erucic acid rapeseed oil should be in the range 67- 70.

4.14.5 The **concentration of brassicasterol** in low erucic acid rapeseed oil should be greater than 5% of total sterols.

4.15 The pesticides residues shall not exceed to what mentioned in Gulf Standard stated in item (2.9).

4.16 The radionuclide limits in the product shall be comply to what mentioned in Gulf Standard

Stated in item (2.11) .

4.17 Contaminant metallic elements in edible vegetable oils shall not exceed to what mentioned in Gulf Standard stated in item (2.13).

5. Packaging, transportation and storage:

5.1 Packaging:

The oils shall be packed in healthy containers made from harm less materials and does not affect on its characteristics< the containers shall be clean, dry, free from any foreign odor, not previously used, with tight covers and shall be comply with Gulf Standard stated in item (2.10).

5.2 Transportation:

The transportation shall be carried out by means protect the containers from damage and contamination.

5.3 Storage:

The containers shall be stored at room temperature (25^{o}C) in good ventilation stores, far from direct sun light and the sources of heat and contamination.

6. Labeling:

Without prejudice to what mentioned in Gulf Standard stated in item (2.1) ,the following shall be Declared on the label:

6.1 Additives and its added content.

6.2 Expiry date in non-coded manner (month-year).

7. Sampling:

Samples shall be taken according with Gulf Standard stated in item (2.2).

8. Methods of examination and test:

The following tests shall be carried out on the representative sample taken according to item (7) to determine its complying with this Standard:

8.1 Detection of pig lard, vegetable and mineral oils, and the determination of relative density, refractive index, saponification value, acid value, iodine value, unsaponifble matter, insoluble impurities, soap content and Halphen test shall be carried out according to Gulf Standard stated in item (2.3).

8.2 Detection and determination of permissible additives to the oils shall be carried out according to Gulf Standard stated in item (2.4).

8.3 Determination of contaminant metallic elements shall be carried out according to Gulf Standard stated in item (2.6).

8.4 Determination of free fatty acids of the oil shall be carried out according to Gulf Standard stated in items (2.8, 2012).

Table No. (1)

Physical and chemical characteristics

Characteristic	Cotton seed oil	Maize oil	Mustard oil	Palm oil	Palm kernel oil	Palm olein	Palm stearin	Palm super olein	Rape seed oil(low erucic acid)	Safflower seed oil	Safflower seed oil (high oleic acid)	Soybean oil
Relative density	0.918-0.926 At 20°C	0.917 - 0.925 At 20°C	0.910-0.921 At 20°C	0.891 - o.899 At 50°C	0.899-o.914 At 40°C	0.899 - o.920 At 40°C	0.881-0.891 At 60°C	0.900-0.925 At 40°C	o.914-0.920 At 20°C	0.922-0.927 At 20°C	0.913-0.919 At 20°C 0.910-0.916 At 25°C	0.919-0.925 At 25°C
Apparent density (g/ml)				0.889 - 0.895 (50°c)		0.896 - 0.898 At 40°C	0.881-0.885 At 60°C	0.897-0.920			0.912-0.914 At 20°C	
Refractive index (at 40°C)	1.458-1.466	1.465 - 1.468	1.461-1.469	1.454 - 1.456 (50°c)	1.448-1.452	1.458 - 1.460	1.447-1.452 At 60°C	1.463-1.465	1.465-1.467	1.467-1.470	1.460-1.464 At 40°C 1.466-1.470 At 25°C	1.466-1.470
Saponification value(mg KOH/g oil)	189-198	187-195	168-184	190-209	230-254	194-202	193-205	180-205	182-193	186-198	186-194	189-195
Unsaponifiable matter (g/kg)	≤ 15	≤ 28	≤ 15	≤ 12	≤ 10	≤ 15	≤ 9	≤ 13	≤ 20	≤ 15	≤ 10	≤ 15
Iodine value	100-123	103-135	92- 125	50.0-55.0	14.1-21.0	≤ 56	≤ 48	≥60	105-126	136-148	80-100	124-139

Table No. (2)

Fatty acids composition (%of total fatty acids)

Characteristic	Cotton seed oil	Maize oil	Mustard oil	Palm oil	Palm kernel oil	Palm olein	Palm stearin	Palm super olein	Rape seed oil(low erucic acid)	Safflower seed oil	Safflower seed oil (high oleic acid)	Soybean oil
C6:0	ND	ND	ND	ND	ND-0.8	ND	ND	ND	ND	ND	ND	ND
C8:0	ND	ND	ND	ND	2.4-6.2	ND	ND	ND	ND	ND	ND	ND
C10:0	ND	ND	ND	ND	2.6-5.0	ND	ND	ND	ND	ND	ND	ND
C12:0	ND-0.2	ND-0.3	ND	ND-0.5	45.0-55.0	0.1-0.5	0.1-0.5	0.1-0.5	ND	ND	ND-0.2	ND-0.1
C14:0	0.6-1.0	ND-0.3	ND-1.0	0.5-2.0	14.0-18.0	0.5-1.5	1.0-2.0	0.5-1.5	ND-0.2	ND-0.2	ND-0.2	ND-0.2
C16:0	21.4-26.4	8.6-16.5	0.5-4.5	39.4-47.5	6.5-10.0	38.0-43.5	48.0-74.0	30.0-39.0	2.5-7.0	5.3-8.0	3.6-6.0	8.0-13.5
C16:1	ND-1.2	ND-0.5	ND-0.5	ND-0.6	ND-0.2	ND-0.6	ND-0.2	ND-0.5	ND-0.6	ND-0.2	Nd-0.2	ND-0.2
C17:0	ND-0.1	ND-0.1	ND	ND-0.2	ND	ND-0.2	ND-0.2	ND-0.1	ND-0.3	ND-0.1	ND-0.1	ND-0.1
C17:1	ND-0.1	ND-0.1	ND	ND	ND	ND-0.1	ND-0.1	ND	ND-0.3	ND-0.1	ND-0.1	ND-0.1
C18:0	2.1-3.3	ND-3.3	0.5—2.0	3.5-6.0	1.0-3.0	3.5-5.0	3.9-6.0	2.8-4.5	0.8-3.0	1.9-2.9	1.5-2.4	2.5-5.4
C18:1	14.7-21.7	20.0-42.2	8.0-23.0	36.0-44.0	12.0-19.0	39.8-46.0	15.5-36.0	43.0-49.5	51.0-70.0	8.4-21.3	70.0-83.7	17-30
C18:2	46.7-58.2	34.0-65.6	10.0-24.0	9.0-12.0	1.0-3.5	10.0-13.5	3.0-10.0	10.5-15.0	15.0-30.0	67.8-83.2	9.0-19.9	48.0-59.0
C18:3	ND-0.4	ND-0.2	6.0-18.0	ND-0.5	ND-0.2	ND-0.6	ND-0.5	0.2-1.0	5.0-14.0	ND-0.1	ND-1.2	4.5-11.0

C20:0	0.2-0.5	0.3-1.0	ND-1.0	ND-1.0	ND-0.2	ND-0.6	ND-1.0	ND-0.4	0.2-1.2	0.2-0.4	0.3-0.6	0.1-0.6
C20:1	ND-0.1	0.2-0.6	5.0-13.0	ND-0.4	ND-0.2	ND-0.4	ND-0.4	ND0.2	0.1-4.3	0.1-0.3	0.1-0.5	ND-0.5
C20:2	ND-0.1	ND-0.1	ND-1.0	ND	ND	ND	ND	ND	ND-0.1	ND	ND	ND-0.1
C22.0	ND-0.6	ND-0.5	0.2-2.5	ND-0.2	ND-0.2	ND-0.2	ND-0.2	ND-0.2	ND-0.6	ND-1.0	ND-0.4	ND-0.7
C22:1	ND-0.3	ND-0.3	22.0-50.0	ND	ND	ND	ND	ND	ND-2.0	ND-1.8	ND-0.3	ND-0.3
C22:2	ND-0.1	ND	ND-0.1	ND	ND	ND	ND	ND	ND-0.1	ND	ND	ND
C24:0	ND-0.1	ND-0.5	ND-0.5	ND	ND	ND	ND	ND	ND-0.3	ND-0.2	ND-0.3	ND-0.5
C24:1	ND	ND	o.5-2.5	ND	ND	ND	ND	ND	ND-0.4	ND-0.2	ND-0.3	ND